Letters to the Editor

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Potential Spring Mating Behavior in the Eastern Pipistrelle (*Perimyotis subflavus*)

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On 5 April 2012, we were conducting a harp-trapping survey of bats at the entrance to Colossal Cave, which is on the property of Mammoth Cave National Park, Edmonson County, Kentucky (N 37° 11' 15.5", W 86° 4' 25.4"). The sky was overcast at dusk, with a temperature at sunset of 13°C. An individual bat was observed at 1921 h CST (ca. 10 min after sunset), flying in a looping pattern (ca. 2–3 m off the ground), outside the cave entrance. Following this behavior, the bat attempted to enter the cave and became entangled in plastic "garden" netting that was used to create a funnel around the harp trap (Kunz and Kurta, 1988). The bat was removed, identified as an eastern pipistrelle (*Perimyotis subflavus*), and quickly released.

The bat continued to fly in a looping pattern and eventually another bat flew in pursuit of the first individual. Within 1 minute, the two bats landed on the bole of a white oak (*Quercus alba*), 7 m above the ground. The bats remained in view (ca. 10 m away) throughout the observation period, and we deduced that copulation was occurring because one individual was mounted on the other at all times, both bats were of the same species, and it did not appear that the mounted individual tried to escape from the other. One bat took flight into the forest canopy 4 min after the assumed copulation began, followed by the second bat 1 min later. Immediately following this observation (1928 h CST), another pair of bats was observed exhibiting a similar looping flight pattern and landed on the bole of a tulip poplar (*Liriodendron tulipifera*) at a height of 9 m. These bats took flight after ca. 1 min, and we could not determine their species.

Mating in *P. subflavus* occurs from autumn to spring. Although most mating is assumed to take place during autumn swarming, the spring mating that does occur corresponds with the time of ovulation in this species (Fujita and Kunz, 1984; Gutherie, 1933) and likely provides females with an opportunity for re-insemination if viable spermatozoa are lost during hibernation (Krutzsch and Crichton, 1986). Although the overall number and viability of spermatozoa carried by male bats through hibernation are likely reduced (Racey, 1979), the males of this species are adapted to a shorter period of sexual dormancy than other bats in North America (Krutzsch and Crichton, 1986).

Vincent and Whitaker (2007) observed mating in *P. subflavus* on three instances within a hibernaculum from the end of February to the middle of March in western Indiana. The timing of our observations in

central Kentucky extends these dates into spring by almost a month and documents presumed copulatory behavior outside a hibernaculum. If fertilization and implantation took place following our mating observation, the minimum 44 days needed for gestation would place parturition in mid-May (Fujita and Kunz, 1984). Although such a date is earlier than expected for the region, it is consistent with the spring of 2012 being one of the warmest in recent years (University of Kentucky, College of Agriculture, Weather Center: wwwagwx.ca.uky.edu).

Observations of spring mating for other bats in North America that hibernate underground are sparse. LaVal and LaVal (1980) observed mating in the northern bat (*Myotis septentrionalis*) as late as 10 April. Other members of this genus, the gray bat (*M. grisescens*) and Indiana bat (*M. sodalis*) have been reported to mate in April in the hibernacula as well (Cope and Humphrey, 1977; Saugey, 1978). Our observations suggest that, at least for *P. subflavus*, spring mating may take place outside the hibernaculum.

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